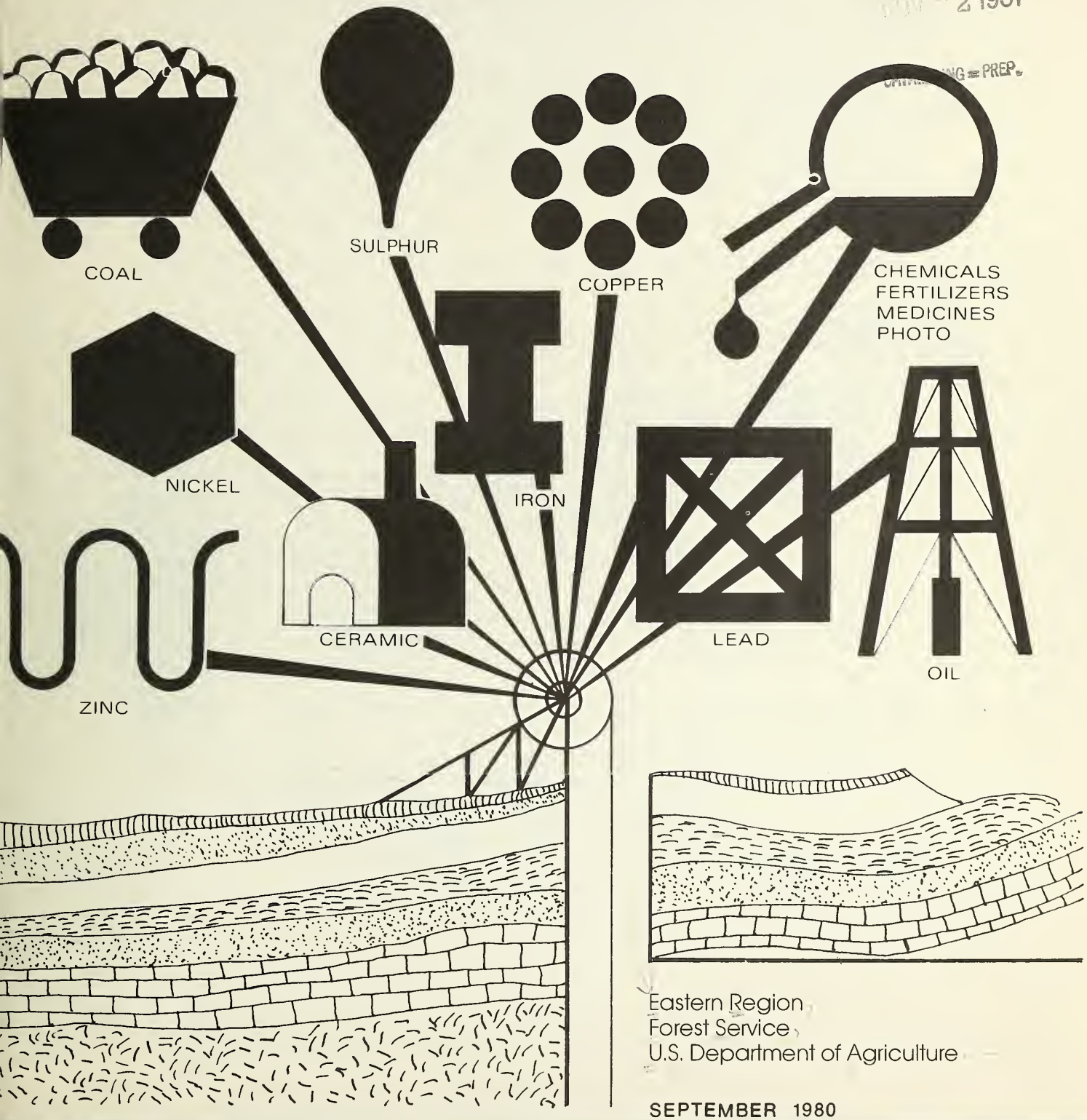
Eastern Region MINERAL RESOURCE OVERVIEW



Eastern Region
Forest Service
U.S. Department of Agriculture

SEPTEMBER 1980

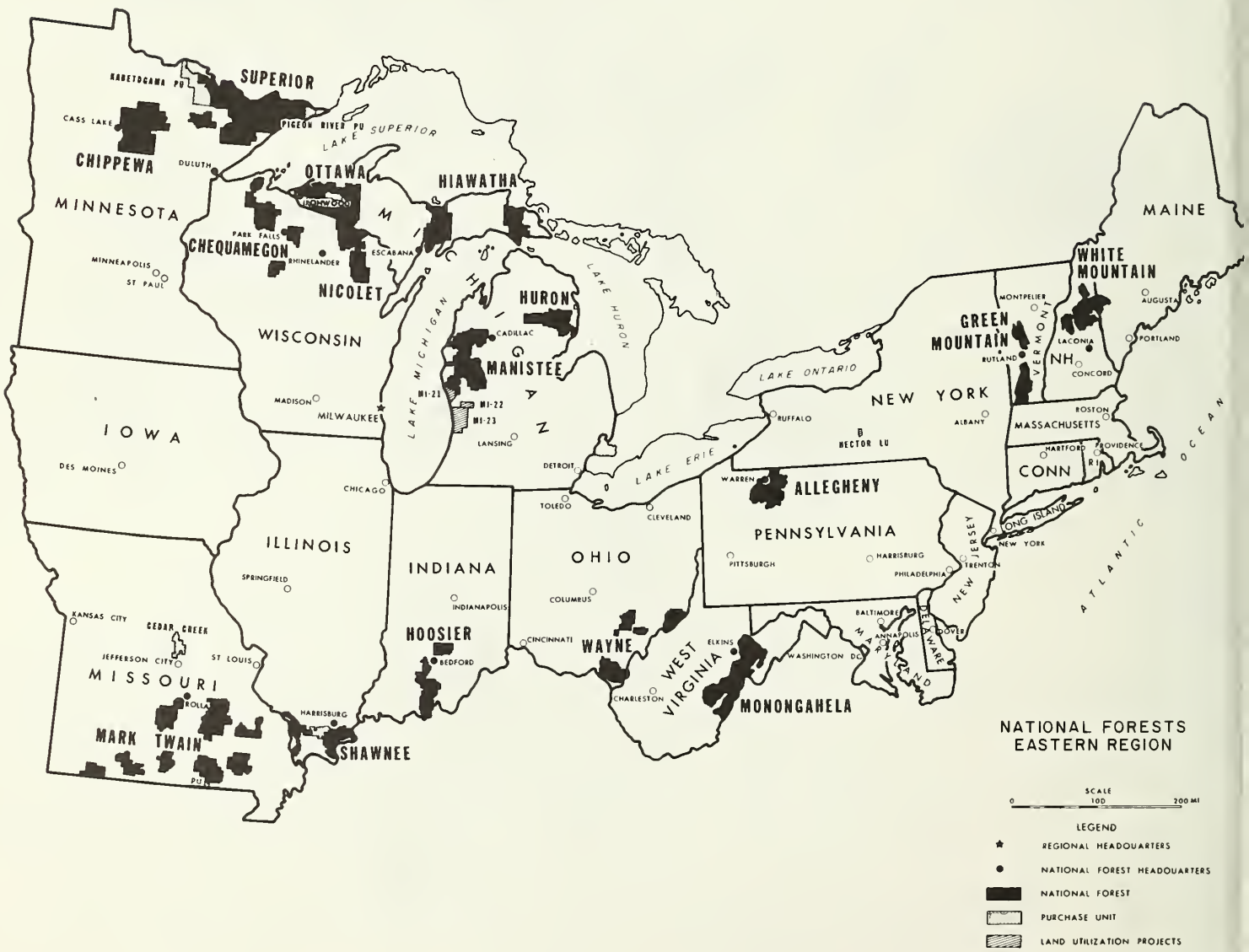
PREFACE

To manage any natural resource, the manager must first find out what is there to manage. This is called "inventory."

Inventory (exploration) is just as essential for wise minerals management as it is for wise management of any resource.

The Forest Service is committed to wise management of all natural resources that can be produced from National Forest System lands. In terms of minerals management on acquired lands, this means keeping open as much land as possible to accommodate mineral inventory work, so long as the purposes for which the lands were acquired are not defeated.

This report provides the basis for comparing the general importance of Eastern Region National Forest System lands in terms of their relative Regional rank as an inventory base. While not useful for actual land use allocations, it serves as a management tool to communicate ideas of relative minerals importance among field units.



Eastern Region
MINERAL RESOURCE OVERVIEW

I. INTRODUCTION

Do all planning areas in Region 9 have equal significance for mineral resource production? What significance will National Forest Service lands have in total mineral production for the Region? How do the National Forests rank in regard to importance of mineral resources on all lands in the 20-State Eastern Region?

These are some of the questions that prompted this study. These and other questions are answered here.

The information and interpretations contained here can be useful in establishing a general understanding of minerals for regional planning under National Forest Management Act (NFMA). Further, this report can help provide a foundation for implementation of the Minerals and Geology Program in the Eastern Region.

II. GENERAL CONCLUSIONS

These following conclusions are explained in more detail in Section IV.

A. NFS lands are more important in conservation of the Region's mineral resources than originally believed.

B. This work clearly indicates some planning areas have far greater mineral importance than others.

C. Information suggests that each National Forest can be placed in one of three categories for regional mineral importance.

III. ANALYTICAL PROCESS

This analysis considered only the 20 States in Region 9 and was conducted by Regional Geologist J. Jacks and Forest Geologist D. Pennington. Information was collected and interpreted during a 2-week period.

Step 1 - Develop a list of important minerals to be considered in the study. The list includes iron, lead, oil, gas, coal, copper, zinc, and numerous industrial minerals such as fluorite, stone, sand/gravel, clay, barite, and manganese. Not all listed minerals were used in the final analysis.

Step 2 - Gathered information about minerals listed, such as their relative importance, quantity, quality, and geographic and stratigraphic locations. This utilized general reference sources including Geological Map of United States, United States Atlas, and National Bulletin and Year Books of USBM (see References for complete list).

The data was then compiled on 1:10,000,000 scale maps and then "lumped" into three categories: energy, metals, and industrial minerals. It was often necessary to generalize area boundaries.

Step 3 - Integrated the information to develop a composite overview map indicating which land areas are currently most important for exploration and development. Criteria included:

A. Final map shall have three categories of minerals importance: HIGH-MEDIUM-LOW (H-M-L).

B. Aggregate acreage of any category would not exceed 50 percent of total regional area.

C. Aggregate acreage of any category would not be less than 15 percent of total regional area.

The final map shows this approximate distribution: HIGH 20 percent, MEDIUM 35 percent, and LOW 45 percent (see Figure 5). Discussion about interpretations is below.

ENERGY MINERALS: The final analysis was done using only oil, gas and coal. Geothermal potential for the Region is extremely low. Production of the Region's oil/shale or atomic mineral deposits is currently uneconomical.

Using the coal map (see Figure 1) and oil/gas map (see Figure 2), each exploration/production area was ranked H-M-L based upon assumed quantity and quality and production potential. These two maps were then combined into a "Regional Energy Map" (see Figure 3). This map shows energy exploration/production areas and ranks them relative to each other.

METALS: Final analysis did not require combination of factor maps. All metals are shown on Figure 4 and include iron, lead, zinc, copper, nickel and manganese.

INDUSTRIAL MINERALS: Information was gathered for phosphate, barite, gypsum, salt, clay, fluorite, limestone, and sand/gravel, but is not documented in this report. Many of these elements had relatively broad distribution and would have little influence on the final map. Special minerals of national significance, such as fluorite, were generally found to occur in areas already of high importance for energy and metals.

Final Derivative Map (Figure 5)

This map utilized only Figure 3 (ENERGY) and Figure 4 (METALS). The category for LOW was a rather simple determination, since about 45 percent of the Region is identified as not having any special significance for either energy or metals. Therefore, any area not defined to have some special importance on Figures 3 and 4 was classified as LOW.

The remaining 55 percent was then separated into MEDIUM and HIGH. First, all areas rated as having high energy importance (Figure 3) were automatically placed into the HIGH group. This was done because of national energy problems. Since this represented only about 10 percent of the Region, it was necessary to add other areas in order to achieve the minimum of 15 percent. Areas such as Mesabi Iron Range in Minnesota and Viburnum Lead Belt in Missouri were added next because of their high economic-social significance to the Region. Areas with special importance for zinc, copper and nickel were also included. This added an additional 10 percent to the HIGH category. The remaining 35 percent of the Region was classed as MEDIUM.

The final interpretative map for minerals importance in the Eastern Region is shown in Figure 5.

IV. CONCLUSIONS

These conclusions are based upon consideration of the final regional interpretative map (Figure 5).

A. NFS lands have a disproportionately large amount of HIGH and MEDIUM areas when compared to the regional average.

For example, if NFS lands followed the regional average for LOW, 45 percent of NFS lands should be in that category. Visual inspection of Figure 5 indicates only about 10 percent of NFS land ranked as LOW. About 20 percent of NFS land should be ranked as HIGH to meet the regional average; actually there is about 40 percent.

B. There are wide differences in minerals importance among planning areas within the Eastern Region. Some planning areas, such as Prairie, have very little area ranked HIGH with most of the area ranked LOW. Others, such as Appalachian, have nearly all HIGH areas and contain very little area ranked LOW.

This suggests an important difference in how NFS lands in these planning areas should be managed if they are to receive proper and adequate consideration of mineral resources. The following chart provides a comparison of the planning areas in terms of minerals importance.

	% Area HIGH for Minerals	% Area LOW for Minerals	Regional Rank **
Lake States	35	40	1
Prairie	15	65	5
*Ozark	45	5	2
*Midlands	60	35	4
Appalachian	70	5	3
New England	5	45	6
*Piedmont	0	55	7

* Applies only to that part of the planning area in Eastern Region. May be different pending consideration of mineral interpretations for Southern Region.

** Relative rank based on subjective judgment of Regional Geologist who considered scarcity of minerals in combination with Regional and National socio/economic welfare.

Planning Area Discussion

Lake States - While there are energy minerals present, metals in Minnesota, Michigan and Wisconsin rank as some of the most important in the United States. They contribute greatly to regional socio/economic welfare and to national security.

Prairie - This area is strongly deficient in nonfuel minerals but has regionally significant deposits of energy and low-value bulk minerals.

Ozark - This area is deficient in both fuel and some low-value bulk minerals but is the Nation's greatest source of lead. Minerals importance cannot be overemphasized because of the significant contribution to Gross National Product (GNP) and balance of trade.

Midlands - This area is a principal oil/gas/coal producer and is nationally significant in production of fluorite and limestone.

Appalachian - This is the Region's principal planning area for energy production. There is strong industrial dependency on fuel minerals produced from this area. Socio/economic welfare of the Region is strongly dependent on this planning area for minerals.

New England - This is one of the Region's least important planning area for minerals but mining activities in adjacent Canada suggest potential for status change.

Piedmont - Mineral resources in Eastern Region's part of this planning area appear to have little meaningful implication to the economy and social welfare of the Eastern Region.

C. National Forests in R-9 fall into several combinations of H/M/L. They are divided into three categories of relative importance in terms of mineral resources:

Type A: Those with nearly all HIGH or combinations of HIGH and MEDIUM.

Type B: Those with all MEDIUM or some combination of HIGH and LOW.

Type C: Mostly LOW.

Type A Forests: Allegheny, Mark Twain, Monongahela, Nicolet, Shawnee, Superior, and Wayne.

Type B Forests: Chequamegon, Green Mountain, Hoosier, Huron, Manistee, and Ottawa.

Type C Forests: Chippewa, Hiawatha, and White Mountain.

The Forest Service must cooperate with the U.S. Department of the Interior (USDI) to assure adequate availability of minerals from National Forest System lands managed in the Eastern Region. Making sure that critical mineral areas remain available for prospecting is an important aspect of this cooperation. Obviously, "Type A" National Forests are more important than "Type C" from a minerals perspective. A strong cooperative relationship with USDI would require Eastern Region to work harder at making lands on "Type A" National Forests more accessible for mineral activities than on "Type C" National Forests.

V. REFERENCES

A. Geologic Map USA, 1976
B. USBM Minerals Facts and Problems, 1975
C. USBM Minerals Year Book for U.S.A., Vols. 1 and 2
D. Great Lakes Basin Commission (USBM) Appendix 5 Mineral Resources, 1974
E. U.S.A. Atlas, 1963

Figures

1. Regional Coal
2. Regional Oil/Gas
3. Energy Interpretation
4. Regional Metals
5. Regional Minerals Interpretation
6. Planning Areas

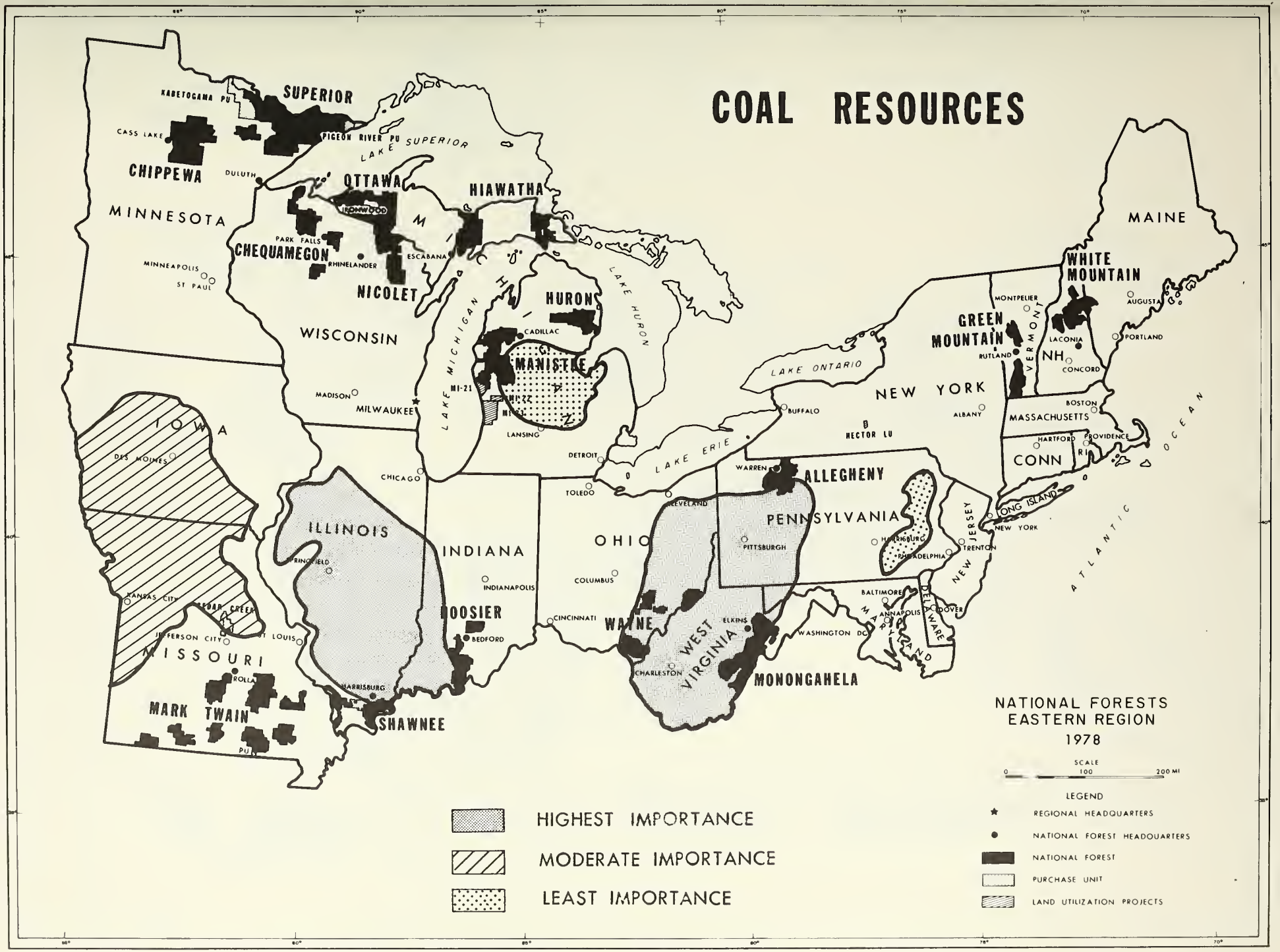

COAL RESOURCES
SUPERIOR
KABETOGAMA PU
CASS LAKE
PIGEON RIVER PU
LAKE SUPERIOR
CHIPPEWA
DULUTH
OTTAWA
HIAWATHA
IRONWOOD
MINNESOTA
PARK FALLS
CHEQUAMEGON
RHINELANDER
ESCABANA
MINNEAPOLIS
ST PAUL
NICOLET
HURON
LAKE MICHIGAN
LAKE HURON
CADILLAC
WISCONSIN
MANISTEE
MI-21
MADISON
MILWAUKEE
LANSING
DETROIT
CHICAGO
TOLEDO
CLEVELAND
IOWA
DES MOINES
ILLINOIS
SPRINGFIELD
INDIANA
INDIANAPOLIS
OHIO
COLUMBUS
CINCINNATI
KANSAS CITY
CEDAR CREEK
JEFFERSON CITY
ST LOUIS
MISSOURI
ROLLA
HOOSIER
BEDFORD
WAYNE
ELKINS
WEST VIRGINIA
CHARLESTON
MONONGAHELA
HARRISBURG
SHAWNEE
MARK TWAIN
PU
WASHINGTON DC
BALTIMORE
ANNAPOLIS
DOVER
DELAWARE
MARYLAND
NEW JERSEY
TRENTON
PHILADELPHIA
PITTSBURGH
WARREN
ALLEGHENY
PENNSYLVANIA
LAKE ERIE
BUFFALO
ALBANY
NEW YORK
LAKE ONTARIO
HECTOR LU
LONG ISLAND
NEW YORK
ATLANTIC OCEAN
MONTPELIER
VERMONT
RUTLAND
GREEN MOUNTAIN
WHITE MOUNTAIN
MAINE
AUGUSTA
PORTLAND
LACONIA
NH
CONCORD
BOSTON
MASSACHUSETTS
HARTFORD
PROVIDENCE
RI
CONN
HIGHEST IMPORTANCE
MODERATE IMPORTANCE
LEAST IMPORTANCE
NATIONAL FORESTS
EASTERN REGION
1978
SCALE
0 100 200 MI
LEGEND
REGIONAL HEADQUARTERS
NATIONAL FOREST HEADQUARTERS
NATIONAL FOREST
PURCHASE UNIT
LAND UTILIZATION PROJECTS

FIGURE 1

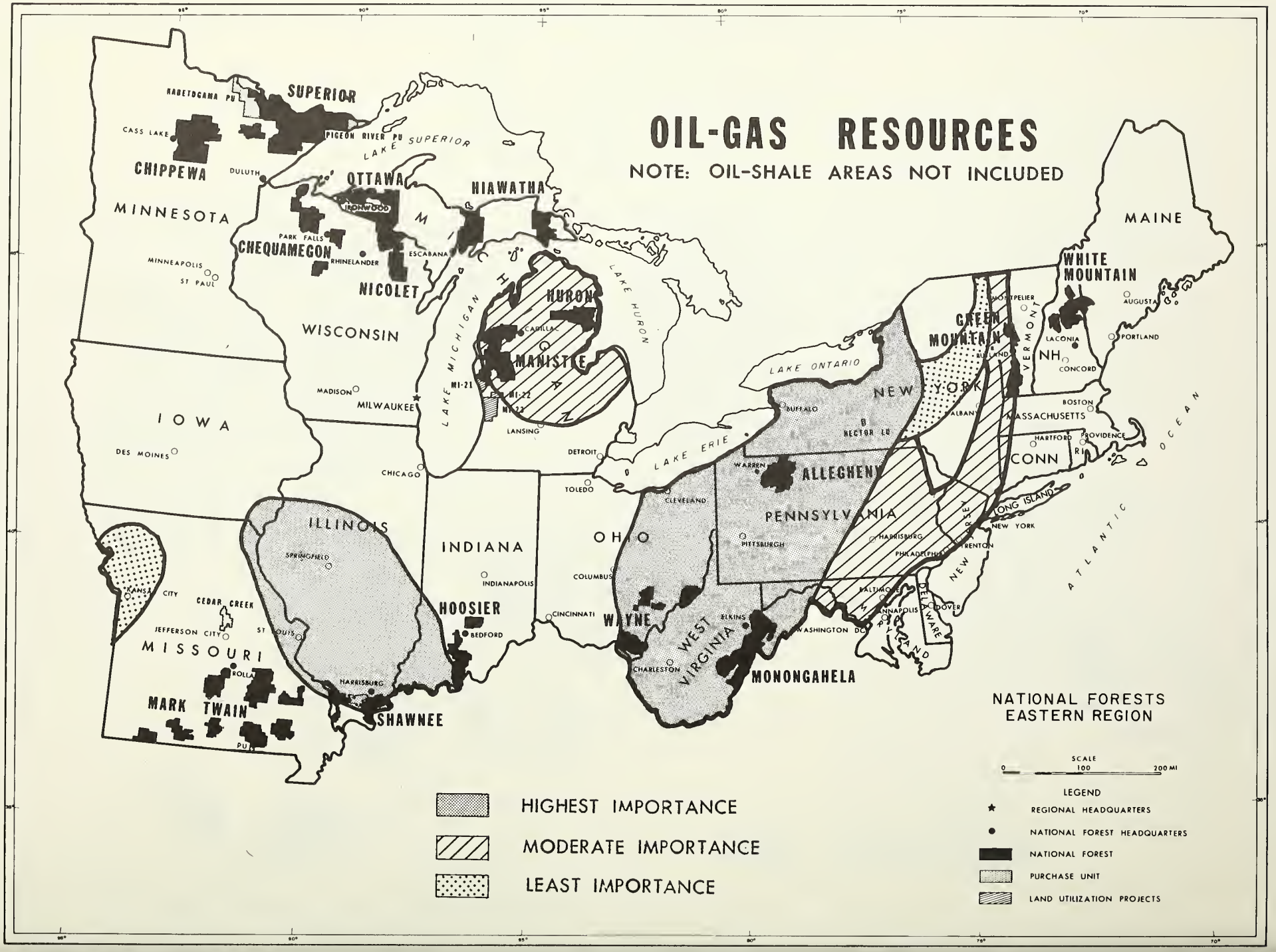

OIL-GAS RESOURCES
NOTE: OIL-SHALE AREAS NOT INCLUDED
SUPERIOR
CHIPPEWA
OTTAWA
HIAWATHA
CHEQUAMEGON
NICOLET
HURON
MANISTEE
MINNESOTA
WISCONSIN
MICHIGAN
IOWA
ILLINOIS
INDIANA
OHIO
MISSOURI
HOOSIER
WAYNE
MONONGAHELA
SHAWNEE
MARK TWAIN
ALLEGHENY
GREEN MOUNTAIN
WHITE MOUNTAIN
MAINE
VERMONT
NH
CONN
RI
MASSACHUSETTS
NEW YORK
PENNSYLVANIA
WEST VIRGINIA
MARYLAND
DELAWARE
NEW JERSEY
LONG ISLAND
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ERIE
LAKE ONTARIO
ATLANTIC OCEAN
NATIONAL FORESTS
EASTERN REGION
SCALE
0 100 200 MI
LEGEND
REGIONAL HEADQUARTERS
NATIONAL FOREST HEADQUARTERS
NATIONAL FOREST
PURCHASE UNIT
LAND UTILIZATION PROJECTS
HIGHEST IMPORTANCE
MODERATE IMPORTANCE
LEAST IMPORTANCE

FIG. 2

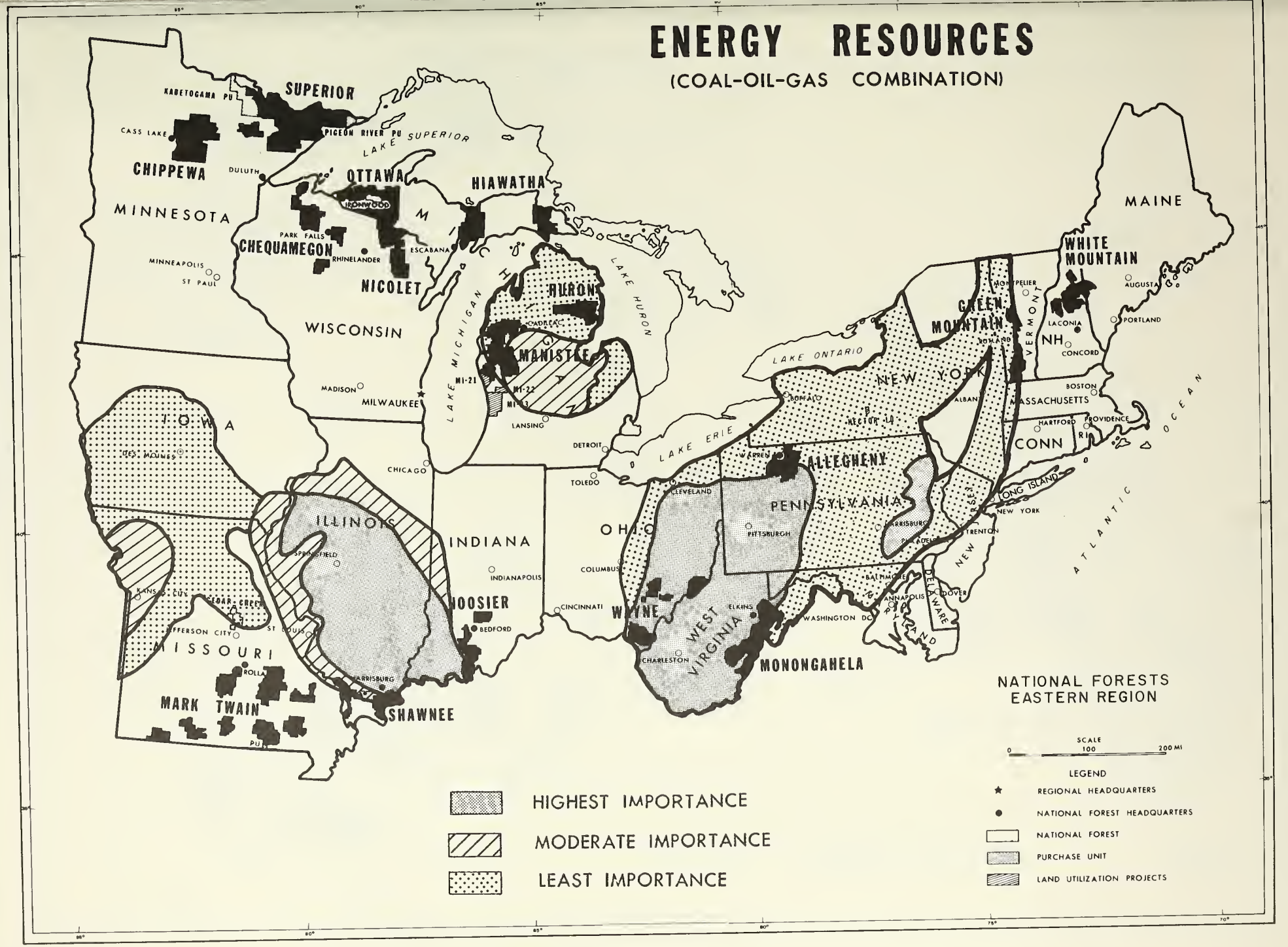

ENERGY RESOURCES
(COAL-OIL-GAS COMBINATION)
SUPERIOR
KABETOGAMA PU
CASS LAKE
PIGEON RIVER PU
LAKE SUPERIOR
CHIPPEWA
DULUTH
OTTAWA
HIAWATHA
IRONWOOD
MINNESOTA
PARK FALLS
CHEQUAMEGON
RHINELANDER
ESCABANA
NICOLET
MINNEAPOLIS
ST PAUL
WISCONSIN
HURON
CADILLAC
MANISTEE
LAKE MICHIGAN
LAKE HURON
MADISON
MILWAUKEE
MI-21
MI-22
MI-23
LANSING
DETROIT
CHICAGO
TOLEDO
LAKE ERIE
LAKE ONTARIO
NEW YORK
BUFFALO
ALBANY
ALLEGHENY
WARREN
CLEVELAND
PENNSYLVANIA
PITTSBURGH
HARRISBURG
PHILADELPHIA
TRENTON
NEW JERSEY
ATLANTIC OCEAN
LONG ISLAND
NEW YORK
GREEN MOUNTAIN
MONTPELIER
BOMOND
VERMONT
WHITE MOUNTAIN
LACONIA
NH
CONCORD
AUGUSTA
PORTLAND
MAINE
BOSTON
MASSACHUSETTS
HARTFORD
PROVIDENCE
RI
CONN
IOWA
DES MOINES
ILLINOIS
SPRINGFIELD
INDIANA
INDIANAPOLIS
OHIO
COLUMBUS
CINCINNATI
WAYNE
HOOSIER
BEDFORD
KANSAS CITY
SEDALIA
CEDAR CREEK
JEFFERSON CITY
ST LOUIS
MISSOURI
ROLLA
HARRISBURG
MARK TWAIN
SHAWNEE
PU
WEST VIRGINIA
ELKINS
CHARLESTON
MONONGAHELA
WASHINGTON DC
BALTIMORE
ANNAPOLIS
MARYLAND
DELAWARE
DOVER
HIGHEST IMPORTANCE
MODERATE IMPORTANCE
LEAST IMPORTANCE
NATIONAL FORESTS
EASTERN REGION
SCALE
0
100
200 MI
LEGEND
REGIONAL HEADQUARTERS
NATIONAL FOREST HEADQUARTERS
NATIONAL FOREST
PURCHASE UNIT
LAND UTILIZATION PROJECTS

FIG. 3

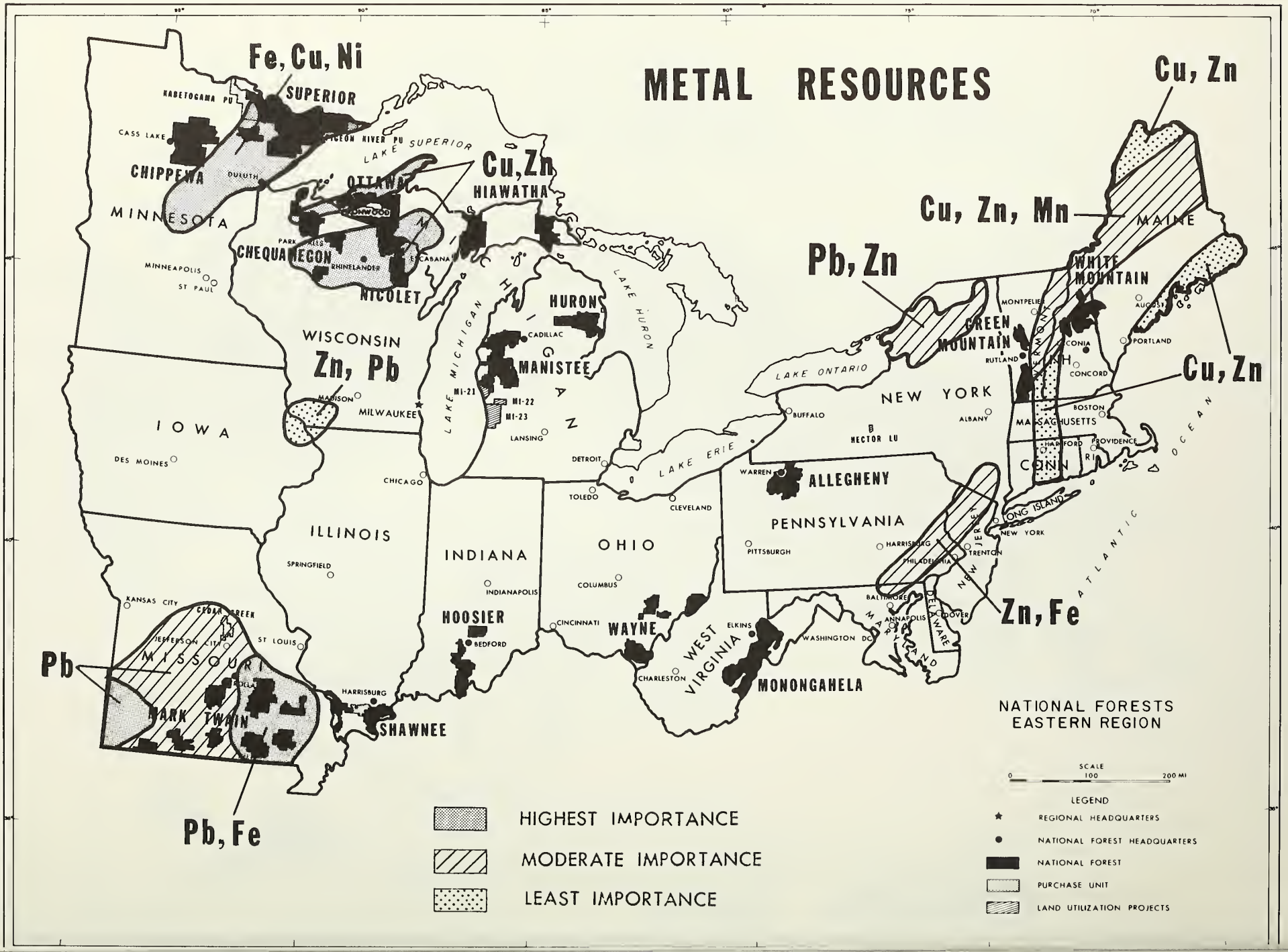

METAL RESOURCES
Fe, Cu, Ni
SUPERIOR
Cu, Zn
HIAWATHA
Cu, Zn, Mn
MAINE
Pb, Zn
WHITE MOUNTAIN
GREEN MOUNTAIN
Cu, Zn
CHIPPEWA
OTTAWA
CHEQUAMEGON
NICOLET
HURON
MANISTEE
Zn, Pb
ALLEGHENY
Zn, Fe
Pb
MARK TWAIN
HOOSIER
WAYNE
MONONGAHELA
Pb, Fe
SHAWNEE
MINNESOTA
WISCONSIN
IOWA
ILLINOIS
INDIANA
OHIO
PENNSYLVANIA
NEW YORK
WEST VIRGINIA
MARYLAND
DELAWARE
NEW JERSEY
CONN
MASSACHUSETTS
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ERIE
LAKE ONTARIO
ATLANTIC OCEAN
HIGHEST IMPORTANCE
MODERATE IMPORTANCE
LEAST IMPORTANCE
NATIONAL FORESTS
EASTERN REGION
SCALE
0 100 200 MI
LEGEND
REGIONAL HEADQUARTERS
NATIONAL FOREST HEADQUARTERS
NATIONAL FOREST
PURCHASE UNIT
LAND UTILIZATION PROJECTS

FIG. 4

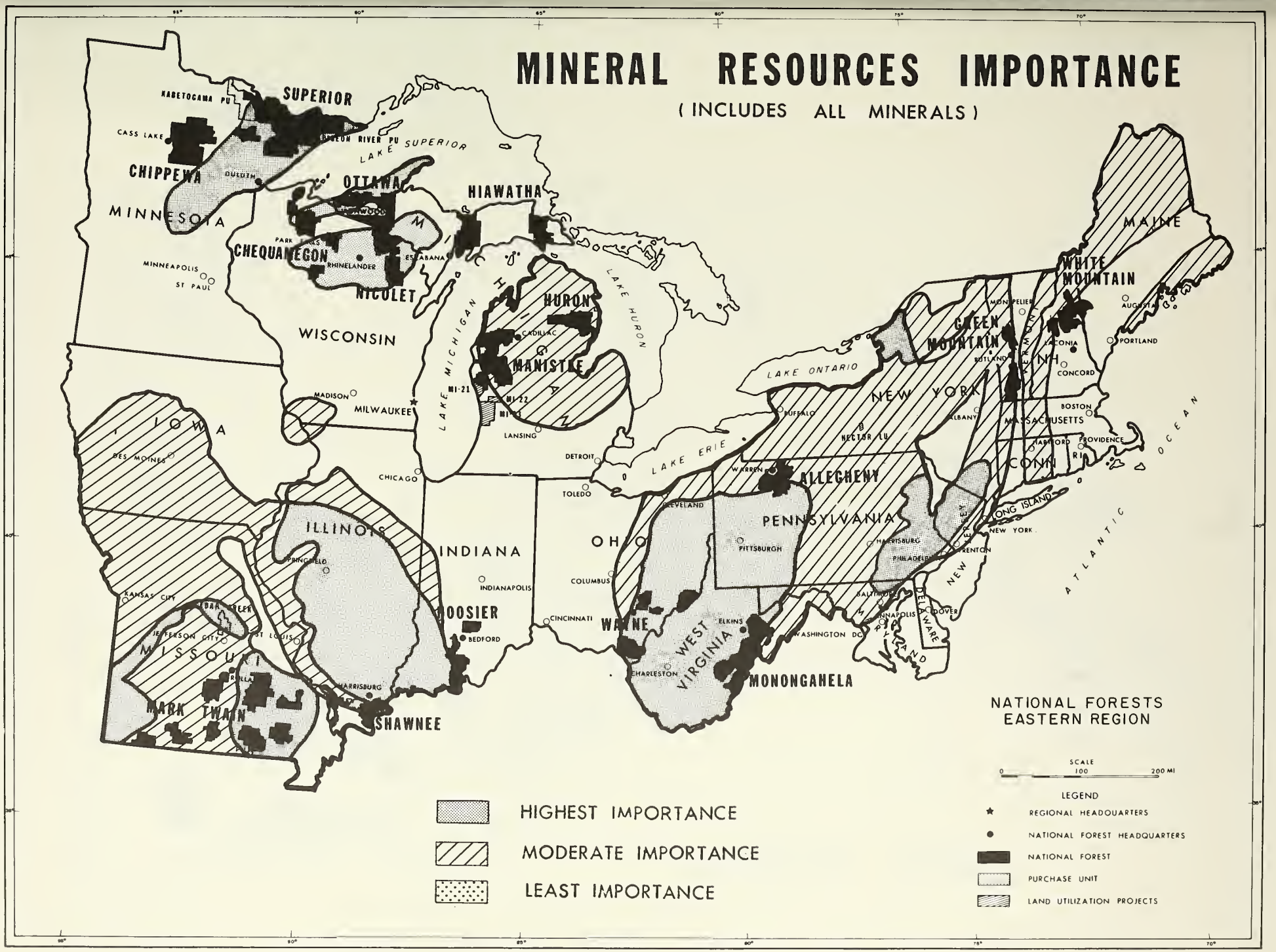

MINERAL RESOURCES IMPORTANCE
(INCLUDES ALL MINERALS)
SUPERIOR
CHIPPEWA
OTTAWA
HIAWATHA
CHEQUAMEGON
NICOLET
HURON
MANISTEE
MINNESOTA
WISCONSIN
MICHIGAN
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ONTARIO
LAKE ERIE
NEW YORK
MAINE
WHITE MOUNTAIN
GREEN MOUNTAIN
IOWA
ILLINOIS
INDIANA
OHIO
PENNSYLVANIA
ALLEGHENY
MISSOURI
MARK TWAIN
SHAWNEE
HOOSIER
WAYNE
WEST VIRGINIA
MONONGAHELA
ATLANTIC OCEAN
NATIONAL FORESTS
EASTERN REGION
SCALE
0 100 200 MI
LEGEND
REGIONAL HEADQUARTERS
NATIONAL FOREST HEADQUARTERS
NATIONAL FOREST
PURCHASE UNIT
LAND UTILIZATION PROJECTS
HIGHEST IMPORTANCE
MODERATE IMPORTANCE
LEAST IMPORTANCE

FIG. 5

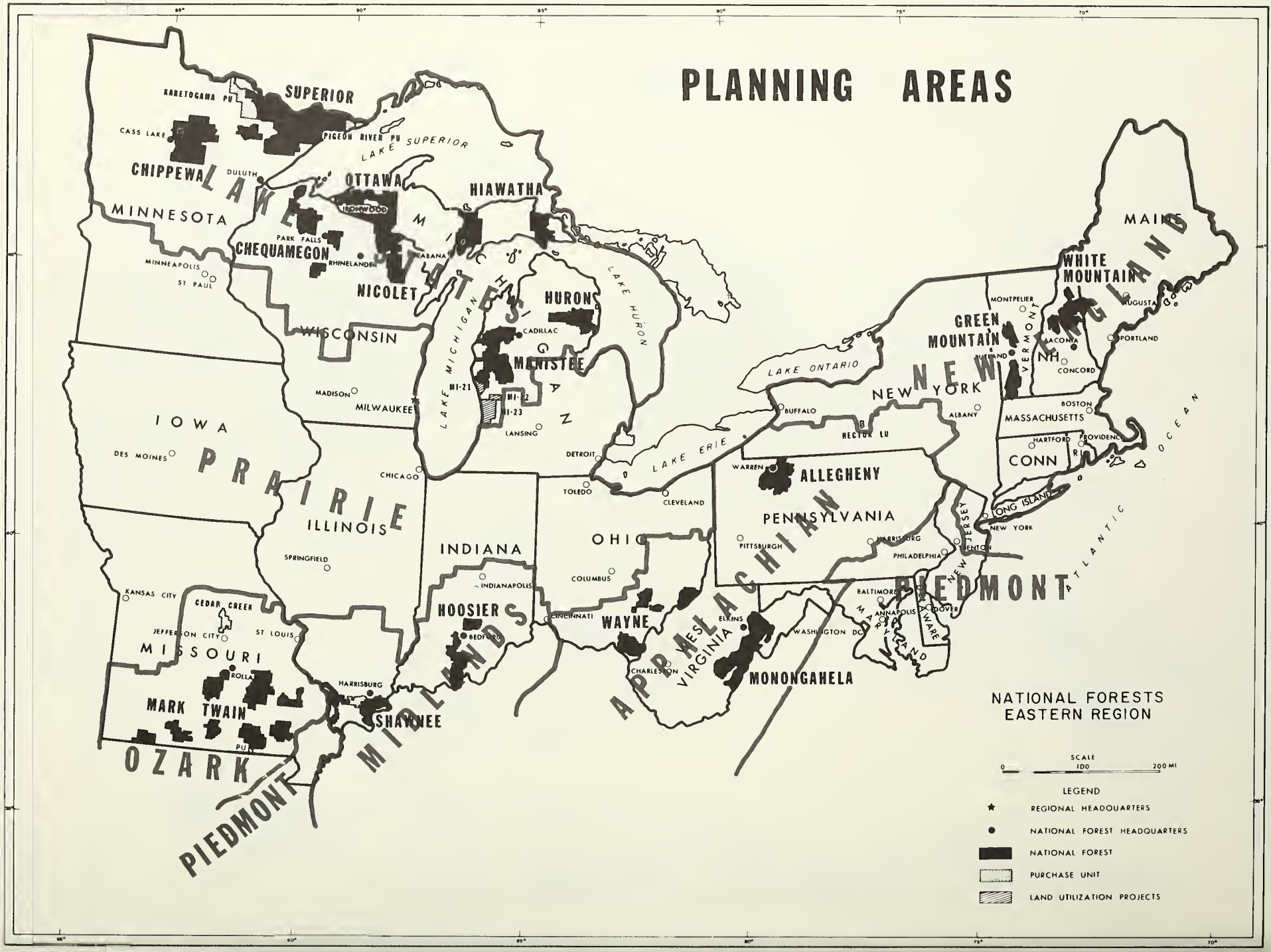

PLANNING AREAS
SUPERIOR
KARETOGAMA PU
CASS LAKE
PIGEON RIVER PU
LAKE SUPERIOR
CHIPPEWA
DULUTH
OTTAWA
IRONWOOD
HIAWATHA
MINNESOTA
PARK FALLS
CHEQUAMEGON
RHINELANDER
ABANA
MINNEAPOLIS
ST PAUL
NICOLET
HURON
CADILLAC
WISCONSIN
MANISTEE
LAKE MICHIGAN
LAKE HURON
MI-21
MI-22
MI-23
MADISON
MILWAUKEE
LANSING
DETROIT
IOWA
DES MOINES
PRAIRIE
CHICAGO
TOLEDO
CLEVELAND
LAKE ERIE
ILLINOIS
SPRINGFIELD
INDIANA
INDIANAPOLIS
OHIO
COLUMBUS
KANSAS CITY
CEDAR CREEK
JEFFERSON CITY
ST LOUIS
HOOSIER
BEDFORD
CINCINNATI
WAYNE
MISSOURI
ROLLA
HARRISBURG
MARK TWAIN
SHAWNEE
OZARK
PIEDMONT
MIDLANDS
APPALACHIAN
CHARLESTON
ELKINS
VIRGINIA
MONONGAHELA
LAKE ONTARIO
BUFFALO
NEW YORK
ALBANY
HECTOR LU
WARREN
ALLEGHENY
PENNSYLVANIA
PITTSBURGH
HARRISBURG
PHILADELPHIA
BALTIMORE
ANNAPOLIS
WASHINGTON DC
DOVER
DELAWARE
MARYLAND
NEW JERSEY
TRENTON
LONG ISLAND
NEW YORK
ATLANTIC OCEAN
NEW ENGLAND
MAINE
WHITE MOUNTAIN
MONTPELIER
AUGUSTA
GREEN MOUNTAIN
VERMONT
LACONIA
PORTLAND
NH
CONCORD
BOSTON
MASSACHUSETTS
HARTFORD
PROVIDENCE
RI
CONN
PIEDMONT
NATIONAL FORESTS
EASTERN REGION
SCALE
0
100
200 MI
LEGEND
REGIONAL HEADQUARTERS
NATIONAL FOREST HEADQUARTERS
NATIONAL FOREST
PURCHASE UNIT
LAND UTILIZATION PROJECTS

Fig. 6

Public Law 91-631
91st Congress, S. 719
December 31, 1970

An Act

84 STAT. 1876

To establish a national mining and minerals policy.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Mining and Minerals Policy Act of 1970". Mining and Minerals Policy Act of 1970.

SEC. 2. The Congress declares that it is the continuing policy of the Federal Government in the national interest to foster and encourage private enterprise in (1) the development of economically sound and stable domestic mining, minerals, metal and mineral reclamation industries, (2) the orderly and economic development of domestic mineral resources, reserves, and reclamation of metals and minerals to help assure satisfaction of industrial, security and environmental needs, (3) mining, mineral, and metallurgical research, including the use and recycling of scrap to promote the wise and efficient use of our natural and reclaimable mineral resources, and (4) the study and development of methods for the disposal, control, and reclamation of mineral waste products, and the reclamation of mined land, so as to lessen any adverse impact of mineral extraction and processing upon the physical environment that may result from mining or mineral activities.

For the purpose of this Act "minerals" shall include all minerals and mineral fuels including oil, gas, coal, oil shale and uranium. "Minerals."

It shall be the responsibility of the Secretary of the Interior to carry out this policy when exercising his authority under such programs as may be authorized by law other than this Act. For this purpose the Secretary of the Interior shall include in his annual report to the Congress a report on the state of the domestic mining, minerals, and mineral reclamation industries, including a statement of the trend in utilization and depletion of these resources, together with such recommendations for legislative programs as may be necessary to implement the policy of this Act. Report to Congress.

Approved December 31, 1970.

LEGISLATIVE HISTORY:

HOUSE REPORT No. 91-1442 (Comm. on Interior and Insular Affairs).
SENATE REPORT No. 91-390 (Comm. on Interior and Insular Affairs).
CONGRESSIONAL RECORD:
Vol. 115 (1969): Sept. 5, considered and passed Senate.
Vol. 116 (1970): Sept. 21, considered and passed House, amended.
Oct. 14, Dec. 18, Senate concurred in House amendments.

National Forests provide a variety of uses, products, and pleasures for people. They were originally established to protect watersheds and supply timber, and they still do. But in addition, these forest lands are now rich in wildlife, forage, and recreation opportunities. These and other uses are managed by the Forest Service U. S. Department of Agriculture. Specialists in many fields coordinate and balance uses so that all Americans will receive maximum benefits throughout the years.

R9-2-10-80-LWM

☆ U.S. GOVERNMENT PRINTING OFFICE: 1980—750-480